UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,464	01/21/2004	Paul Rich	WLJ.099	1392

20987 7590 02/04/2009

VOLENTINE & WHITT PLLC
ONE FREEDOM SQUARE
11951 FREEDOM DRIVE SUITE 1260
RESTON, VA 20190

EXAMINER
MCDONALD, RODNEY GLENN

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
02/04/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/760,464
Filing Date: January 21, 2004
Appellant(s): RICH ET AL.

Adam C. Volentine
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed November 17, 2008 appealing from the Office action mailed March 18, 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

0 708 478 A1	MOHN et al.	10-1995
2 310 433	SCHERER	08-1997
2003/0075522 A1	WEICHERT et al	04-2003

5,423,971	ARNOLD et al.	06-1995
4,762,728	KEYSER et al.	08-1988
4,426,246	KRAVITZ et al.	01-1984

Terashiga et al. "Influence of Microstructural Variation on the Electrical Properties of SiC Microthermistors", IEEE Transactions on Electron Devices, vol. 46, No. 3, March 1999, pp. 555-559.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 2, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mohn et al. (EP 0 708 478) in view of Francis (U.S. Pat. 6,465,353).

Regarding claim 1, Mohn et al. teach an apparatus for processing a substrate including a chamber 10, a plasma creation element 12 for creating a plasma in a zone of the chamber and an electrostatic chuck for retaining a substrate 34 at a location in or adjacent to the zone such that an upper surface of the substrate 34 faces away from the chuck. The apparatus further includes a shield 26 disposed on the zone side of the chuck overlying the peripheral portion of the upper surface of the substrate 34 at the location for preventing the presence of a plasma between the shield and the periphery portion of the upper surface of the substrate at the location whilst allowing processing of the substrate. (Column 3 lines 15-21; Column 4 lines 26-41; Column 5 lines 16-58; Column 6 lines 1-12) Mohn et al. teach that the shield can be electrically conducting since it can be made of SiC. (Column 3 lines 53)

Regarding claim 2, Mohn et al. teach that the shield is generally annular and circumjacent the chuck. (See Fig. 3)

Regarding claim 7, Mohn et al. teach a method of processing a substrate including electrostatically clamping the substrate to the chuck, creating a plasma adjacent the outwardly facing face of the clamped substrate, and locating a shield overlying the periphery of the outwardly facing face of the clamped substrate to prevent the presence of plasma between the shield and the periphery while processing the substrate. (Column 3 lines 15-21; Column 4 lines 26-41; Column 5 lines 16-58; Column 6 lines 1-12) Mohn et al. teach that the shield can be electrically conducting since it can be made of SiC. (Column 3 lines 53)

The differences between Mohn et al. and the present claims is that the plasma guard being a dark space shield is not discussed (Claims 1, 7) and the thickness of the substrate wafer is not discussed (Claims 1, 7, 8).

Regarding the plasma guard being a dark space shield (Claims 1, 7), The Examiner considers the plasma guard to be a dark space shield since the plasma guard does exactly what the claims require which is to prevent the presence of plasma between the shield and the periphery portion of the upper surface of the substrate. (Column 3 lines 15-21)

Regarding the thickness of the wafer in claims 1, 7 and 8, Francis teach that semiconductor devices need thin wafers for processing. The thickness can be about 100 microns or less. (Column 1 lines 13-26, lines 39-60; Column 2 lines 38-42)

The motivation for utilizing the feature of Francis is that it allows processing wafers for semiconductor dies. (Column 1 lines 39-40)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Mohn et al. by utilizing the features of Francis because it allows for processing semiconductor wafer dies.

Claims 4-6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mohn et al. in view of Francis as applied to claims 1, 2, 7 and 8 above, and further in view of Weichart et al. (U.S. PG PUB. 2003/0075522 A1).

The differences not yet discussed grounding the shield (Claims 4, 11), connecting the chuck as a plasma creating element (Claim 5) and powering the chuck (Claim 6).

Regarding claims 4, 11, Weichart et al. teach connecting a dark space shield 5b to ground. (Page 4 paragraph 0043)

Regarding claim 5, Weichart et al. teach that a chuck can also be a plasma creating element. (Page 4 paragraph 0042, paragraph 0043)

Regarding claim 6, Weichart et al. teach that a chuck can be powered. (Page 4 paragraph 0042, paragraph 0043)

The motivation for utilizing the features of Weichart et al. is that it allows for producing a high density plasma. (Paragraph 0011)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Weichart et al. because it allows for producing a high density plasma.

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mohn et al. in view of Francis as applied to claims 1, 2, 7 and 8 above, and further in view of Kravitz et al. (U.S. Pat. 4,426,246) or Keyser et al. (U.S. Pat. 4,762,728).

The difference not yet discussed is where the material forming the shield is a metal (Claims 9, 10) and grounded the shield is not discussed (Claim 11).

Regarding claims 9, 10, Mohn et al. teach materials for the shield can be silicon carbide as discussed above or any other high heat and high strength material. (See Mohn et al. Column 3 lines 52-54) Kravitz et al. teach that a dark space shield can be made of a high heat and high strength material such as metal. (Column 6 lines 51-59) Keyser et al. teach that a dark space shield can be made of a high heat and high strength material such as aluminum or stainless steel. (Column 4 lines 29-32)

Regarding claim 11, Kravitz et al. teach grounding the dark space shield. (Column 6 lines 56-59) Keyser et al. teach grounding the shield. (Column 4 lines 30-32)

The motivation for utilizing the features of Kravitz et al. is that it allows for preventing discharge form occurring at the sides and the bottom of the electrode. (Column 6 lines 51-59)

The motivation for utilizing the features of Keyser et al. is that it allows for protecting the electrode. (Column 6 lines 51-59)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Kravitz et al. or Keyser et

al. because it allows for preventing discharge from occurring at the substrate holder or protecting the electrode.

Claims 1, 2, 4-8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weichart et al. (US PGPUB 2003/0075522 A1) in view of Francis (U.S. Pat. 6,465,353) and Arnold et al. (U.S. Pat. 5,423,971) or Scherer (GB 2310433) or Mohn et al. (EP 0 708 478).

Regarding claim 1, Weichart et al. teach an apparatus for processing a substrate wafer including a chamber 1. (Page 4 paragraph 0044) A plasma creation element 2 for creating a plasma in a zone of the chamber. (Page 2 paragraph 0022) An electrostatic chuck for retaining a substrate at a substrate location in or adjacent to the zone. (Page 4 paragraph 0041) The apparatus includes a dark space shield 5b circumjacent the periphery of the location for preventing the presence of the plasma between the shield and the periphery of a substrate in the location whilst allowing processing of the substrate. (Page 4 paragraph 0041; paragraph 0043) Weichart et al. describe the shield 5b as electrically conducting. (Page 4 paragraph 0041, paragraph 0043)

Regarding claim 2, Weichart et al. describes the shield 5b as generally annular. (Page 4 paragraph 0041)

Regarding claim 4, Weichart et al. teach that the shield 5b is grounded. (Page 4 paragraph 0043)

Regarding claim 5, Weichart et al. teach that the chuck is also a plasma creating element. (Page 4 paragraph 0042, paragraph 0043)

Regarding claim 6, Weichart et al. teach that the chuck is powered. (Page 4 paragraph 0042, paragraph 0043)

Regarding claim 7, Weichart et al. teach a method for processing a wafer. (Page 4 paragraph 0046) Including electrostatically clamping the substrate to the chuck. (Page 4 paragraph 0041) Creating a plasma adjacent to the outwardly facing face of the clamped substrate and locating a dark space shield between the plasma and the periphery of the substrate to prevent the presence of plasma between the shield and the periphery whilst allowing processing of the substrate. (Page 2 paragraph 0022; Page 4 paragraph 0045) Weichart et al. describe the shield 5b as electrically conducting. (Page 4 paragraph 0041, paragraph 0043)

Regarding claim 11, Weichart et al. teach that the shield 5b is grounded. (Page 4 paragraph 0043)

The differences between Weichart et al. and the present claims is that the thickness of the wafer substrate is not discussed (Claims 1, 7 and 8) and the dark space shield overlying a peripheral portion of the upper surface of the substrate is not discussed (Claims 1, 7)

Regarding the thickness of the wafer in claims 1, 7 and 8, Francis teach that semiconductor devices need thin wafers for processing. The thickness can be about 100 microns or less. (Column 1 lines 13-26, lines 39-60; Column 2 lines 38-42)

The motivation for utilizing the feature of Francis is that it allows processing wafers for semiconductor dies. (Column 1 lines 39-40)

Regarding claims 1, 7, Arnold et al. teach that a dark space shield should overlie a periphery of the substrate 17. (See Abstract; Fig. 1) Scherer teach locating a dark space shield (i.e. 6 coupled to 14) overlying a periphery of the substrate. (See Abstract; Figure) Mohn et al. teach that a dark space shield 26 should overlie a periphery of the substrate. (See Mohn et al. discussed above)

The motivation for utilizing the features of Arnold et al. is that it allows for preventing formation of parasitic plasmas. (See Abstract)

The motivation for utilizing the features of Scherer is that it allows for inhibiting defects in the film. (Page 2 para. 2, 3)

The motivation for utilizing the features Mohn et al. is that it allows for preventing plasma to effect the electrostatic chuck. (Page 3 lines 15-21)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Weichart et al. by utilizing the feature of Francis and Arnold et al. or Scherer or Mohn et al. because it allows for processing wafers for semiconductor dies and preventing formation of parasitic plasmas, inhibiting defects in the films and preventing damage to the electrostatic chuck.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weichart et al. in view of Francis and Arnold et al. or Scherer or Mohn et al. as applied to claims 1, 2, 4-8 and 11 above, and further in view of Kravitz et al. (U.S. Pat. 4,426,246) or Keyser et al. (U.S. Pat. 4,762,728).

The difference not yet discussed is where the material forming the shield is a metal. (Claims 9, 10)

Regarding claims 9, 10, Mohn et al. teach materials for the shield can be silicon carbide as discussed above or any other high heat and high strength material. (See Mohn et al. Column 3 lines 52-54) Kravitz et al. teach that a dark space shield can be made of a high heat and high strength material such as metal. (Column 6 lines 51-59) Keyser et al. teach that a dark space shield can be made of a high heat and high strength material such as aluminum or stainless steel. (Column 4 lines 29-32)

The motivation for utilizing the features of Kravitz et al. is that it allows for preventing discharge form occurring at the sides and the bottom of the electrode. (Column 6 lines 51-59)

The motivation for utilizing the features of Keyser et al. is that it allows for protecting the electrode. (Column 6 lines 51-59)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Kravitz et al. or Keyser et al. because it allows for preventing discharge from occurring at the substrate holder or protecting the electrode.

(10) Response to Argument

I. Response to the Arguments of Claims 1, 2, 7, 8 as unpatentable under 35 U.S.C. 103 over Mohn et al. (EP 0708478) in view of Francis (U.S. Pat. 6,465,353).

In response to the argument that Mohn et al.'s plasma guard is not an electrically conductive element, it is argued that Mohn et al.'s plasma guard can be made of SiC. SiC can act as a conductive material. Applicant admits that SiC like all materials can act as an electrical conductor given the right conditions. Furthermore as evidenced by

Terashiga et al. SiC is shown to exhibit electrical conductivity. It is the Examiner's position that SiC is an electrical conductive material based on the evidence and the admission by Applicant. Therefore the plasma guard of Mohn et al. is made of an electrical conductor which overlies the periphery of the substrate for providing a dark space shield. (See Mohn et al. discussed above)

II. Response to the Arguments of Claims 4-6 and 11 as unpatentable under 35 U.S.C 103 over Mohn et al. in view of Francis and further in view of Weichart et al. (U.S. 2003/0075522).

In response to the argument that it would not be obvious to apply the teaching of Weichart et al.' s grounding to the plasma guard of Mohn et al. because Mohn et al.'s guard is insulative, it is argued as discussed above that Mohn et al.'s dark space guard (i.e. shield) being made of SiC would be an electrical conductor and as such should be grounded as shown by Weichart et al. who suggest grounded the dark space shield 5b. (See Mohn et al. and Weichart et al. discussed above)

In response to the argument that it would not be obvious to apply the teachings of Weichart et al. to the teachings of Mohn et al. because of the positional differences between the dark space shield in Weichart et al. and Mohn et al., it is argued that grounding the shield provides dark space screening as well as the function as acting as a counter electrode. (See Weichart et al. and Mohn et al. discussed above)

III. Response to the Arguments of Claims 9-11 as unpatentable under 35 U.S.C. 103 over Mohn et al. in view of Francis and further in view of Kravitz et al. (U.S. Pat. 4,426246) or Keyser et al. (U.S. Pat. 4,762,728):

In response to the argument that it would not be obvious to apply the teachings of Kravitz et al. or Keyser et al. to the teachings of Mohn et al. because of the positional differences between the dark space shield in Kravitz et al., Keyser et al. and Mohn et al., it is argued that one of ordinary skill in the art would look to Kravitz et al. or Keyser et al. to prevent discharge from sides and bottom of the electrode. (See Kravitz et al. or Keyser et al. discussed above)

IV. Response to the Arguments of Claims 1, 2, 4-6 and 11 as unpatentable under 35 U.S.C. 103 over Weichart et al. in view of Francis and Arnold et al. (U.S. Pat. 5,423971) or Scherer (GB 2,310,433) or Mohn et al.:

In response to the argument that one of ordinary skill in the art would not modify Weichart et al. with the teachings of Arnold or Scherer because the substrate is moving in Arnold or Francis, it is argued that one of ordinary skill in the art would look to Arnold et al. or Scherer to cover the edges of the substrate with a dark shield to prevent parasitic plasmas or plasma damage to the substrate holder and would thus modify Weichart et al. in this way. (See Arnold et al. or Scherer discussed above)

In response to the argument that one of ordinary skill in the art would not modify Weichart et al. with the teaching of Mohn et al. because Mohn et al. teach an insulating plasma guard not an electrically conductive one, it is argued that one would look to Mohn et al. because Mohn et al. teach that the plasma guard can be made of an

electrically conductive material such as SiC as discussed above or because Mohn et al. recognize the plasma guard can be made of any other high heat and high strength materials or because Mohn et al. recognize that there is a need for having the dark space shield to cover the edge of the substrate and as such one of ordinary skill in the art would modify Weichart et al. with the teachings of Mohn et al. to prevent plasma from effecting the chuck and edges of the substrate. (See Mohn et al. discussed above)

V. Response to the Arguments of Claims 9 and 10 as unpatentable under 35 U.S.C. 103 over Weichart et al. in view of Francis and Arnold et al. or Scherer or Mohn et al. and further in view of Kravitz et al. or Keyser et al.:

In response to the argument that it would not be obvious to apply the teachings of Kravitz et al. or Keyser et al. because of the position of their dark space shields, it is argued that one of ordinary skill in the art would look to Kravitz et al. or Keyser et al. to prevent discharge from sides and bottom of the electrode and furthermore all the references of Arnold et al. or Scherer or Mohn et al. teach providing a dark space shield over the edges of the substrate.. (See Kravitz et al. or Keyser et al. discussed above and Arnold et al., Scherer and Mohn et al. discussed above)

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Rodney G. McDonald/

Primary Examiner, Art Unit 1795

Conferees:

/Nam X Nguyen/

Supervisory Patent Examiner, Art Unit 1753

Nam X. Nguyen

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795